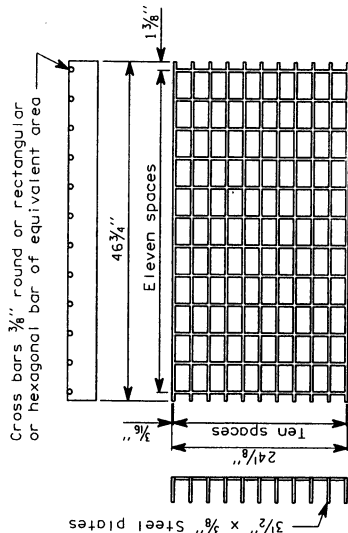


APPENDIX F

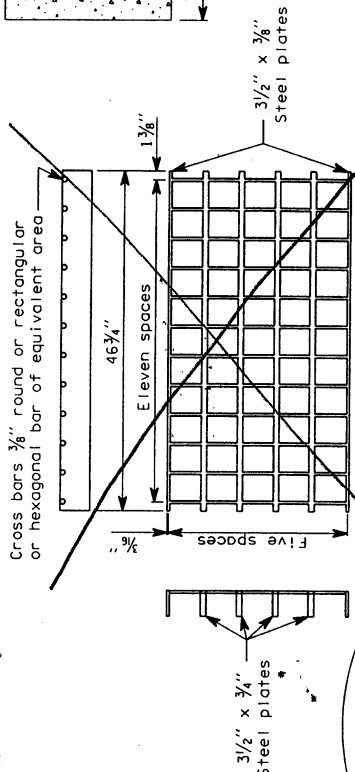
Vendor Data

NOTES

1. Angles shall be set so that each bearing bar of prefabricated grate shall have full bearing on both ends. The finished top of concrete shall be even with the grate surface.
2. All exposed concrete shall be finished with a $\frac{1}{2}$ " radius edger tool.
3. The grade line of the top inside of any pipe shall enter no lower than the grade line of the top inside of the outlet pipe.
4. Culvert or sewer pipes may be set at any angle to the centerline of the highway and may enter the inlet on any side at any reasonable angle, provided the outside of the pipe can be contained between two opposite walls.
5. Grate B will be used only when specified in the Contract.

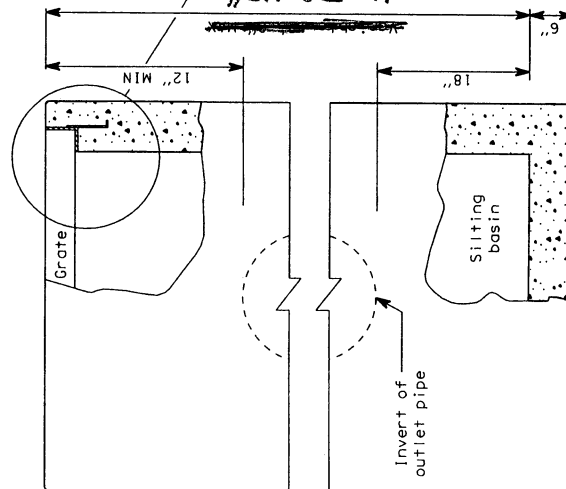
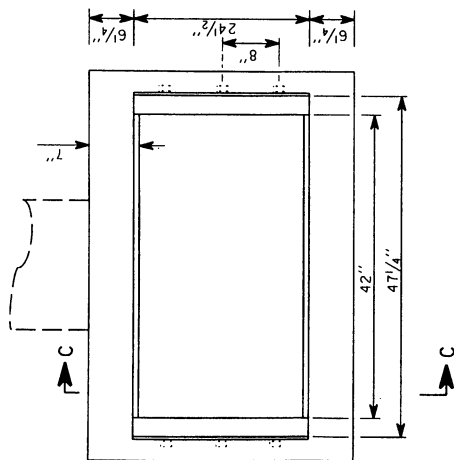


GRATE A
(Weight is approximately 215 Lbs)



GRATE B
(Weight is approximately 215 Lbs)

60% OF TS&C LOAD (PIT, 1985)
BASED ON CAPTURED
UP TO 48"



GRATE INLET TYPE 1



EXPIRES JUNE 30, 1987

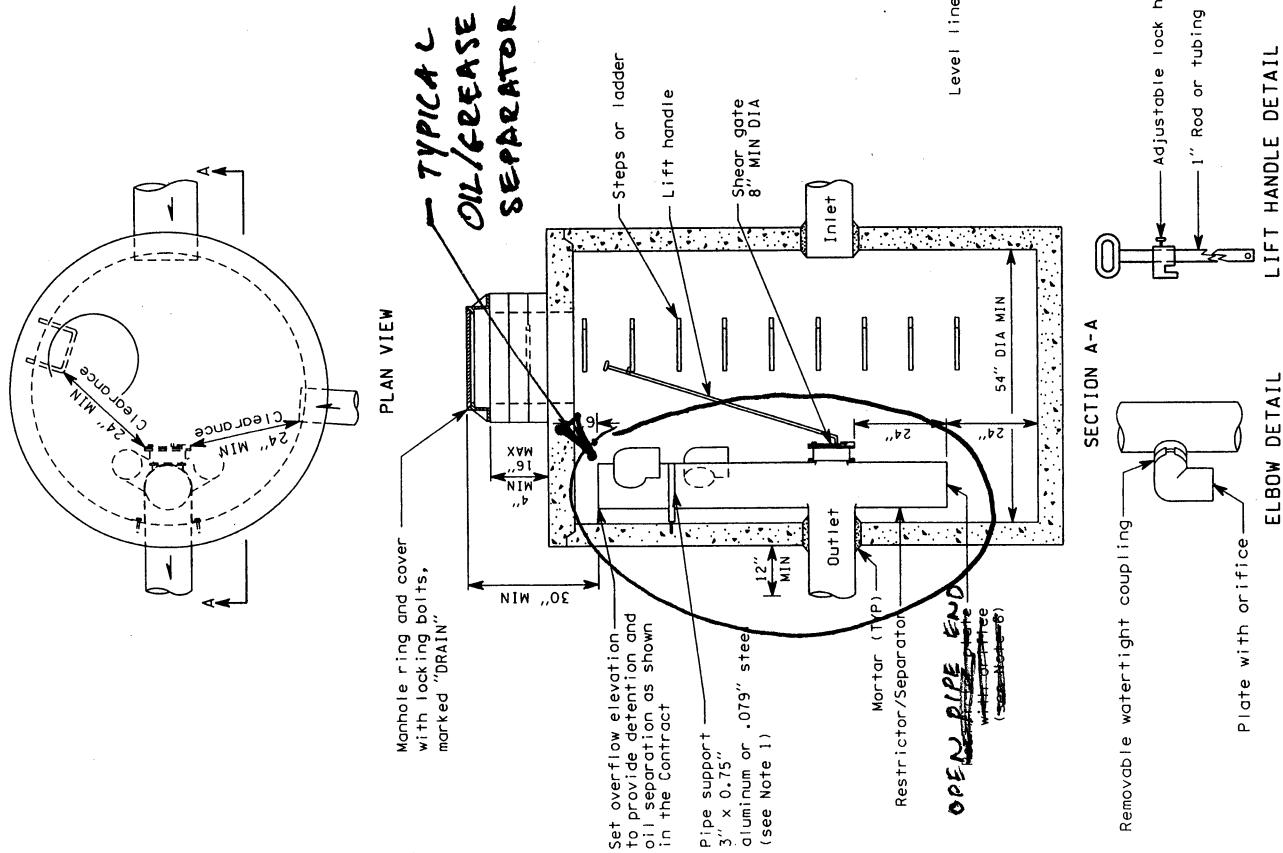
STANDARD PLAN B-4b

APPROVED FOR PUBLICATION
 State Design Engineer
 DATE 5.9.97
 WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
 OLYMPIA, WASHINGTON

ALTERNATIVE 3
 MODIFIED CATCH BASIN

NOTES

1. Pipe supports and restrictor/separator shall be constructed of the same material and be anchored at a maximum spacing of 36". Attach pipe supports to manhole with $\frac{3}{8}$ " stainless steel expansion bolts or embed supports into manhole wall 2".
2. The vertical riser stem of the restrictor/separator shall be the same diameter as the horizontal outlet pipe with a minimum diameter of 8".
3. The flow restrictor/separator shall be fabricated from one of the following materials:
0.60" Corrugated Aluminum Alloy Drain Pipe
0.64" Corrugated Galvanized or Aluminumized Steel Drain Pipe
0.60" aluminum alloy flat sheet, in accordance with ASTM B 209M, 5052 H32 or EPS Galvanized steel shall have Treatment 1.
4. Frame and ladder or steps are to be offset so that:
Shear gate is visible from the top; climb-down space is clear of riser and gate; frame is clear of curb.
5. Multi-orifice elbows may be located as shown or all on one side of riser to assure ladder clearance. Size of elbows and placement to be specified in the Contract.
6. Restrictor plate with orifice as specified in the Contract. Omit plate if for oil pollution control only. Opening is to be cut round and smooth.
7. Shear gate shall be made of aluminum alloy in accordance with ASTM B 26M and ASTM B 275, designation ZG32A or cast iron in accordance with ASTM A 48, Class 30B. Lift handle may be solid rod or hollow tubing with adjustable hook as required. Neoprene rubber gasket required between riser mounting flange and gate flange. Mating surfaces of lid and body shall be machined for proper fit. Flange mounting bolts shall be $\frac{3}{8}$ " diameter stainless steel.
8. Shear gate maximum opening shall be controlled by limited hinge movement, stop tab or some other device.
9. Alternate shear gate designs are acceptable, if material specifications are met and flange bolt pattern matches.



ALTERNATIVE 3

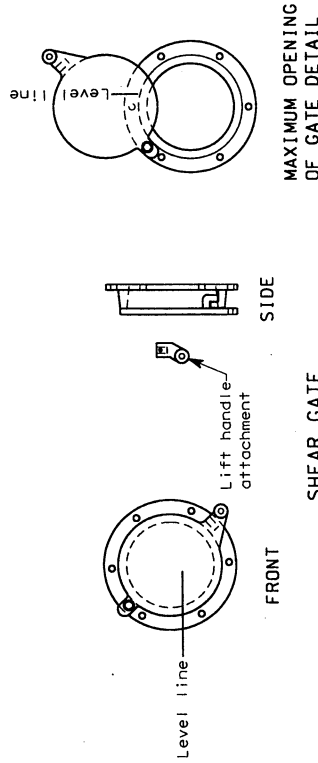
SCHEMATIC OF OIL/GREASE SEPARATOR

CATCH BASIN TYPE 2 WITH FLOW RESTRICTOR -OIL SEPARATOR



STANDARD PLAN B-3

APPROVED FOR PUBLICATION
 David Stivers 5.9.97
 DATE
 STATE DESIGN ENGINEER
 WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
 OLYMPIA, WASHINGTON



SHEAR GATE

SECTION A-A

LIFT HANDLE DETAIL

ELBOW DETAIL

Schwarze Industries

A-series

Regenerative Air Sweepers

All Schwarze A-series sweepers have been designated by the South Coast Air Quality Management District as 'Rule 1186 Certified' for their ability to pick up and contain small-micron material.



Quick Links To A-series Models



[A4000 Information](#)

[A4000 Specifications](#)



[A7000 Information](#)

[A7000 Specifications](#)



[A8000 Information](#)

[A8000 Specifications](#)

Schwarze Industries' regenerative air sweepers are unquestionably the performance leaders of the air sweeping industry. Owners have them in use for an extremely wide variety of municipal, government and heavy duty commercial applications. If a situation can be swept by an air machine, then a sweeper in the Schwarze A-series line can handle it.

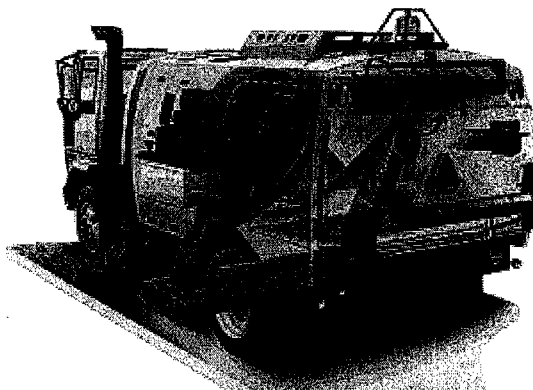
To assure a good fit for virtually any pavement sweeping need, Schwarze Industries' regenerative air sweepers are available in a variety of sizes, from the 4.3 cubic yard capacity Model A4000, to the massive Model A7000, 8.4 cubic yard capacity sweeper that is available in both diesel-powered and CNG-powered configurations. In between -- and with a variable high dumping hopper -- is the 5.8 cubic yard capacity Model A8000, which can even dump directly into dump trucks with sideboards!

No matter which of these sweepers is right for your air sweeping application, you can be assured that your machine of choice will be built Schwarze-tough to provide many years of troublefree service. All incorporate the foremost in recirculating/regenerative air sweeper technology and are the end result of more than a quarter century of applied design expertise. The A4000 and A7000 both come standard with WhisperWheelssm fan systems. This patent-pending, Schwarze-exclusive technology allows these sweepers to operate over 70% quieter than most competitive models. They also have 7% more power, while using 20% less fuel than previous models. These include the breakthrough technology of Schwarze's exclusive new Mechani-Pneumatic Powerhoodsm.

All Schwarze regenerative air sweepers are equipped with *Sweeps-in-Reverse*SM, a capability that is a Schwarze air sweeper hallmark. We're sure you'll agree that the Schwarze A-series models clearly represent the ultimate in air sweeper technology.

Features Include:

- Compliance with environmental mandates.
- Closed circuit vacuum chamber -- contains dust and debris.
- High volume/high velocity airblast to clean micron size particulates.



The Schwarze Industries Team is known around the world for the way they manufacture efficient, dependable and easy-to-operate pavement sweepers, and then back them with the best customer service in the industry. If you have any questions about any of our A-series sweepers, send us an email, or give us a call toll free at 1-800-879-7933.



"New Ideas From The Company That's Sweeping The Earth" SM



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Seen  times

SCHWARZE

Schwarze EV-series Small Micron Environmental Sweepers

Introduction

Model EV1

Specifications

Model EV2

Specifications

Studies
& TestingEV Containment
SystemEV Technology
History

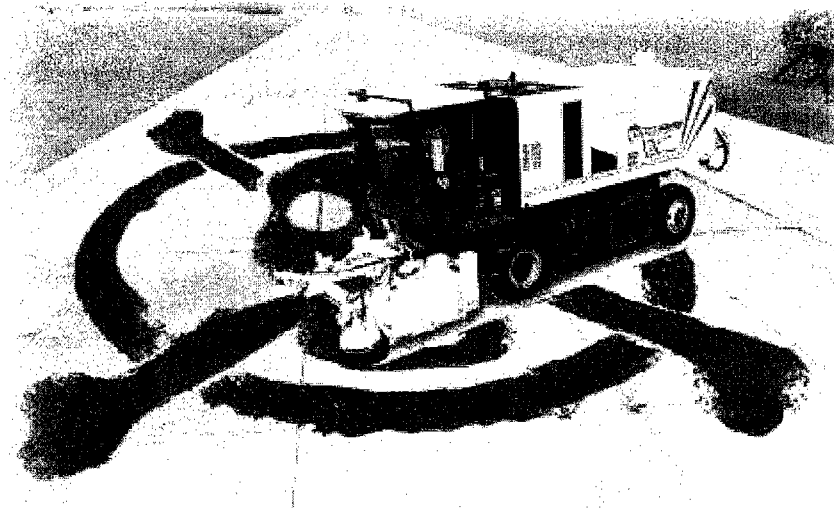
Endorsements

Why EV Now?

Contact Us

EV-series

***The world's Best Available Technology for
managing pavement-based particulates!***



As a dramatization, this Schwarze EV1 cleaner was photographed while picking up coal dust laid out as a skull and crossbones on an airport runway. Note there is no visible dust, either around the sweeper or coming from the exhaust stack located on the top of the sweeper behind the EV's cab area. EV machines are perfect for any organization faced with a pavement-based, small-micron debris problem.

Because it is the most efficient sweeping technology in the world, the EV-series sweepers have been the subject of many independent studies, stories and amazing success stories. For your convenience, we have compiled much of this information into an Adobe Acrobat PDF file. If you have Acrobat Reader (available via free download at www.adobe.com), we invite you to take a look.

Schwarze EV-series cleaners are unlike any

sweeping industry product that has ever before been developed.

The revolutionary new Schwarze EV-series machines are the first -- and only -- true pavement *cleaners*. Unlike traditional sweepers, Schwarze EV-series machines use no water during the sweeping process. As a result, EV-series machines pick up particles as small as 2.5 microns -- 1/28th the width of a human hair -- instead of leaving them on the ground or blowing them into the air like ordinary air sweepers. And, with the addition of Schwarze's sock-and-auger offloading option, collected material can be safely and securely offloaded.

Industry experts and users alike agree that the Schwarze EV-series sweepers are currently the Best Available Technology (BAT) in existence for compliance with EPA-mandated stormwater management plans, industrial site pavement cleaning, and for cleaning pavement in sensitive environmental areas. If your organization faces a challenge with stormwater runoff pollution, or with containing, recycling or reusing toxic or hazardous raw materials, one of Schwarze EV-series sweepers will be ideal for you.



Although they are capable of sweeping in wet conditions, a key to the small-micron pickup capability of the EV-series cleaners is that they use no water during the pickup process. Instead of 'suppressing' dust by using water sprays, EV-series sweepers utilize a multi-patented dry airflow and pickup system. A series of 2.5 micron filters -- each of which are automatically pneumatically cleaned several times per minute -- actually *contain* fugitive dust.

Schwarze EV-series sweepers have been designated by the South Coast Air Quality Management District as 'Rule 1186 Certified' for their ability to pick up and contain small-micron material.



Schwarze EV-series sweepers provide many advantages simply because they use no water during pickup:

- Actual fugitive dust *control* - not 'suppression.'
- Zero fan wear due to abrasion (fan has lifetime warranty).
- Virtually total particulate recovery.
- No water pumps/pulleys/belts and other high maintenance items.
- Easier, faster daily and long-term cleaning of sweeper.
- Can operate in sub-freezing temperatures.
- Much less corrosion problem since no water involved in pickup.
- Fewer dump stops, since there is no water weight to dump.
- Competitive suction capability.

In addition to exceeding the small-micron pickup (PM-2.5) the EPA is targeting under the Clean Water Act, the EV machines provide a host of other advantages. One of the foremost of these is that **Schwarze EV-series machines clean, during normal operation, almost 1 million cubic feet of surrounding air to**

the 2.5 micron level now mandated by the EPA under the Clean Air Act.

Schwarze EV-series machines represent Best Available Technology (BAT) for collecting nuisance or contaminated particles, and for reclamation or recycling.

The patented debris-collection head on Schwarze EV-series machines combines dual counter-rotating brooms with up to 15,000 cf/m of air movement. The unique cleaning system is even able to remove dust and debris right from the pores of concrete - yet is extremely effective at picking up the larger debris associated with traditional air-based sweepers. This combination of pickup capabilities may be accomplished only with the patented Schwarze EV-series Cleaning Systemsm.



The basic premise of the Schwarze EV-series is that recovery plus containment equals management of particulates. This differs dramatically from conventional sweeping systems in which water-sprays are used in an attempt to suppress dust. The Schwarze EV-series machines represent the first equipment offered which don't 'suppress' dust, but rather 'contain' it.

The Schwarze EV-series of particulate management machines don't use water as part of their cleaning system, so they avoid creating PM-10/pollutant slurries-like traditional air sweepers do - as part of their pickup process. Independent testing has shown that this unique dry cleaning approach allows EV-series machines to collect and contain an astonishing 99.6% of small micron particulates. This cleaning method also makes EV-series' technology by far the Best Available Technology for reclaiming and/or recycling raw materials. Users have demonstrated conclusively that EV-series machines can be a significant component of an EPA Best Management Plan for managing PM-10-based pollutants in stormwater runoff.

Another advantage of the EV-series equipment is that it filters nearly 1 million cubic feet of air per hour to an astounding 2.5 microns. This capability - which includes being able to collect a whopping 99.6% of pavement-based small particulates - is a level of performance which has been verified by independent testing agencies.

Schwarze EV-series sweepers provide many environmental advantages over any other pickup system:

- Best Available Technology for EPA Clean Water Act PM-10 compliance.
- Compliance with Clean Air Act emissions standard.
- Ability to recycle/reuse/securely offload collected material (especially important for toxic and hazardous material).
- Meets all applicable government requirements of Clean Air Act *and* Clean Water Act.
- Not polluting 200,000+ gallons of water per year like traditional sweepers.
- Polluted 'dust suppression water' is not being dumped into landfills or

elsewhere.

- Dry recovery and containment of nuisance and recyclable materials.
- Can operate in sub-freezing temperatures, providing year round particulate management.
- Operators can remain safe in a filtered, positive-pressurized cab.
- Operation can take place indoors or out, providing a total cleanup solution.

Schwarze EV-series sweepers are providing an important solution to managers throughout the United States. Contact us for an assessment of how this exciting new technology can benefit you.

Please send us an email if you have any questions or comments, either about the EV-series sweepers or any aspect of the power sweeping industry. You may also reach our main factory location, located in Huntsville, Alabama, USA, by calling 256-851-1200, or call toll free to 1-800-879-7933 anywhere in the US or Canada.



"New Ideas From The Company That's Sweeping The Earth" SM



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[Air Sweepers](#)
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PM10

IMAGINE ... taking care of the world's environment!

Elgin Sweeper makes it possible to do just that with their PM10 efficient mechanical and regenerative air sweepers. So, what is PM10? It is a category of very small particles – small enough to be inhaled deep within the lungs. These particles, of great concern to public health, are less than 10 Microns in diameter, or approximately 1/7th the thickness of a human hair. Not only is it a health issue for all of those breathing the contaminated air, it has created a major concern for manufacturers of industrial equipment such as street sweepers, for they must now become PM10 compliant in certain areas of the country.

The United States Environmental Protection Agency (EPA) has set standards for air quality by identifying acceptable levels of PM10. They have also conducted tests in different parts of the country and have defined several areas, predominantly in the southwestern United States, as PM10 non-attainment areas. This, in short, means these particular regions are not maintaining a healthy standard of air quality. In light of this fact, the EPA is requiring that each of these areas submit a corrective plan of action to meet PM10 emission standards by any reasonable means.

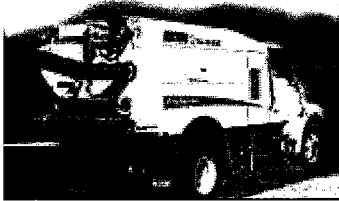
Air quality agencies in several states are in the process of developing air quality plans to bring PM10 concentrations down to healthful levels. These plans include a variety of programs developed to reduce emissions, including dust control for roads, construction areas, landfills, and industrial facilities. PM10 levels may be high in different regions for completely different reasons. As one city may have high PM10 levels from usage of large quantities of deicers subsequent to major snow falls, other cities predominately generate PM10 because of large industries and automobiles. Therefore, each geographical area needs to develop their own plan of attack.

To aid in the reduction of PM10 levels, an organization called the South Coast Air Quality Management District (SCAQMD) has set their own regulations and standards within the southern California basin. Outlining compliance to PM10 standards in their Rule 1186, the SCAQMD is responsible for reducing levels in southern California. The SCAQMD has contracted the Center for Environmental Research Technology, College of Engineering at University of Riverside, California (CE-CERT) to perform the functions for certification of street sweepers. Currently these standards apply only to the state of California. However, other state and local governments are reviewing this type of regulation to see if it might be applicable in their non-attainment areas.

Previously, there was belief that only "air" machines could meet the PM10 test standards; now with new technology, Elgin has six mechanical sweepers also meeting the PM10 standards, including the three-wheel urban category. Elgin's sweepers that are PM10 certified are the Crosswind, Pelican SE, Eagle F, Eagle E, Air Bear, and DLS 550.

How is a sweeper evaluated for PM10 efficiency? It is evaluated in two primary areas. First, a sweeper is tested on its ability to pick-up very small particles. Second – while sweeping, the sweeper can only pick-up a minimal amount of small dust particles. A sweeper must pass both sections of this test with a pick-up efficiency to comply with PM10 efficiency standards.

Now Available
Alternative Fuel Sweepers



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safer world™*

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Street Sweepers

More Tennant Ma

Sweeper/S

Street S

Burnishers and Floor I

Wet/Dry

Specialty I

Centurion

[Additional Information]

The Centurion features a simple, one-button operation so the operator can concentrate on the road. And it's unique, StreetSmart sweeping system brings extra value to your city, providing dependable performance across a full range of debris. Finally, the Centurion's environmentally-friendly dust control system is designed to meet rigid PM-10 requirements year-round.

Standard Features Included but not limited to:

- Exclusive StreetSmart operation with easy-to-operate one-touch controls provides 3 in 1 sweeping operation:
 - Normal routing sweeping
 - Heavy work (sand, chip seal, milling)
 - Leaves and litter sweeping
- Dry dust control with full 300 gallon water system
- Main broom adjustments from cab
- Robust construction for maximum durability
- Large, LCD screen status reporting
- Standard conveyor flush system
- 11,000 lb capacity; dumps up to 10 feet
- Large, washable synthetic filter bag is rot and moisture-resistant
- Efficient HVAC cab system for operator comfort
- Two-foot cab extension adds nearly 60 sq.ft. of space for secure storage
- Dual steering with tilt and telescoping steering wheel
- Air suspension bucket seats
- AM/FM radio with cassette
- Power windows and locks
- Full instrumentation for both operators' positions



Centurion Product Introduction Site



*Creating a cleaner,
safer world™*

CUTAWAY & FEATURES

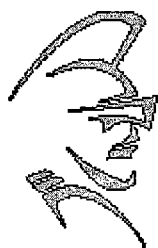
VIDEO

ANIMATION

PHOTO GALLERY

ADDITIONAL INFO

CENTURION™ HOME



CENTURION™

CENTURION™

PERFORMANCE REDEFINED.

You're about to experience sweeping as you never have before. A mechanical broom sweeper with vacuum, Centurion™ is the only truck mounted, PM10-certified street sweeper that can operate with or without water for dust control — great for water conservation and year-round sweeping, even in cold climates. Designed for high-efficiency, one-pass sweeping, Centurion™ is equally effective along curb lines as it is in road construction zones—handling light litter, leaves, sand, milling and chip seal with relative ease—all at the touch of a button. It's going to change the way you sweep, forever.



BUILT BETTER FROM THE GROUND UP.

Centurion™ was born to sweep. First, we listened to customer needs. We heard from managers, public works officials and contractors operating in a variety of challenging environments. Next, we applied customer feedback with our 50 years of outdoor technology and expertise. The result? A new sweeper for a new century, built on a GMC chassis and cab-over design with all the power you'll ever need: a 250-horse 7.2 liter Caterpillar diesel engine. It's a totally new concept in sweeping.



THE PERFECT BALANCE OF BRAINS AND BRAWN.

StreetSmart™ sweeping system automatically adjusts broom and conveyor performance to sweeping conditions. The unique IntelliPower™ system monitors brush wear and optimizes brush tip speed—maximizing brush life while minimizing replacement costs. For fast and efficient cleanup, Centurion is equipped with one custom and four pre-set sweeping modes—economical, normal route, heavy work (sand, chip seal, road milling) and leaves/litter to keep Centurion™ on the job longer, there's an extra large 6.8-yard hopper.

A NEW PERSPECTIVE ON SWEEPING.

From the moment you climb into the Centurion™ Street Sweeper you'll be right at home. The comfortable, all-steel cab gives you plenty of room and an extra gear - nearly 60 square feet. The easy-to-read, touch-screen color console is at your fingertips. One-button operation makes sure the job is done right the first time, every time—reducing operation costs and operator training. And the view, well, it's simply panoramic. Your operators will be able to see the road ahead as well as any obstacles, clearly.

For more information about Centurion, contact us or see the Centurion



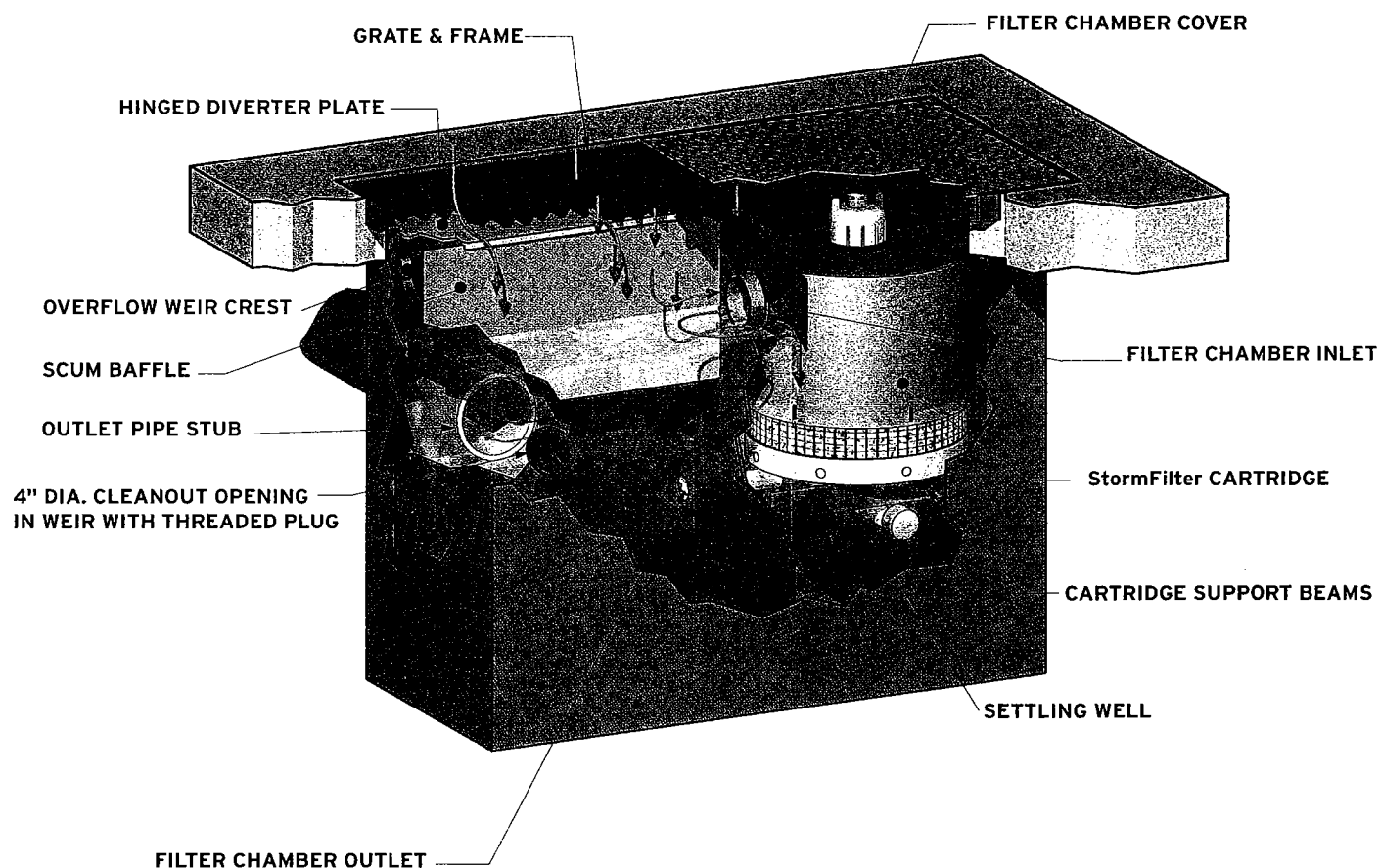
page on our main site.

For more information about Tennant Company and our products, please visit our main site.



CATCHBASIN StormFilter™

CATCHBASIN

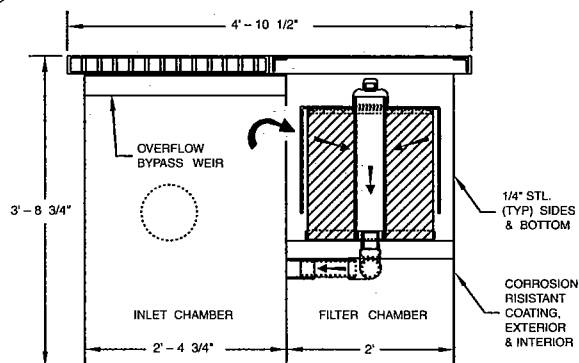


Also available in concrete.

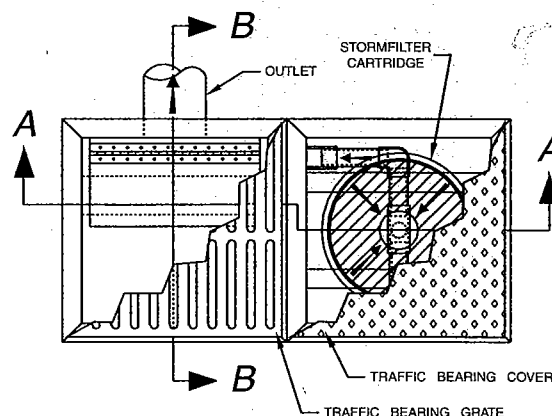




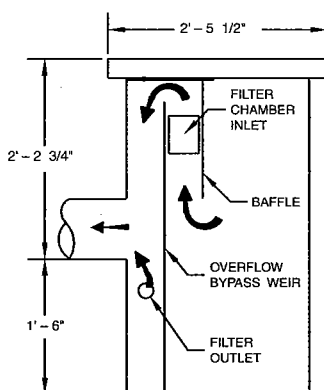
CATCHBASIN StormFilter™



STEEL CATCHBASIN StormFilter – SECTION A – A
SCALE: N.T.S.



STEEL CATCHBASIN StormFilter – PLAN
SCALE: N.T.S.



SECTION B – B
SCALE: N.T.S.

U.S. PATENT No. 5,322,629, 5,624,576, AND OTHER U.S. AND FOREIGN PATENTS PENDING

The Stormwater Management StormFilter® is now available in a steel or concrete catch basin configuration. The CatchBasin StormFilter™ system, an extension of the widely accepted StormFilter Best Management Practice, has been engineered to replace the standard catch basin. In the CatchBasin StormFilter, polluted runoff enters the system through a traffic-bearing grate. In the inlet chamber primary settling of the runoff occurs, and the heavier solids drop to a sump on the vault floor. The water is directed under a baffle into the filter chamber where the StormFilter cartridge is housed. During filtration, lighter solids and soluble pollutants are removed. Clean water is discharged from the filter and directed around the overflow bypass weir to the outlet pipe. During heavy storms, when the flow exceeds the design flow, water in the inlet chamber spills over the bypass weir, preventing the re-suspension of sediments and pollutants trapped in the cartridge chamber.

SYSTEM FEATURES AND BENEFITS

- Proven StormFilter technology targets site-specific pollutants
- Low cost, heavy gauge, all steel construction
- Internal bypass minimizes re-suspension of trapped pollutants
- Simple, low cost installation
- Easy maintenance
- Operation & Maintenance Guidelines available from Stormwater Management Inc.
- Curb opening inlet available
- Also available in concrete

GENERAL SPECIFICATIONS

- StormFilter capacity – 15 gpm/cartridge (up to 4 cartridges)
- Peak hydraulic capacity – 1.0 cfs
- Hydraulic drop (Rim to Invert) – 26.75 inches
- Outlet pipe diameter – up to 8 inches
- Load bearing capacity–H-20 rated. (For higher flows or heavier loads, contact the application engineers at Stormwater Management Inc.)
- Optional corrosion-resistant plastic coating available





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StormFilter™

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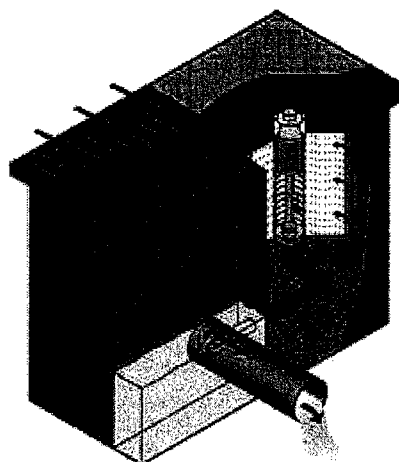
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Narrative Description

The **StormFilter™** is a passive, flow-through stormwater filtration system that utilizes rechargeable filter cartridges housed in concrete vaults. The siphon-driven cartridges, which draw stormwater through the filter media, are installed in precast or cast-in-place concrete vaults with pipe underdrains cast into the concrete floor. Through mechanical filtration, ion exchange and adsorption, the media removes total suspended solids (TSS), soluble metals, soluble phosphorus, nitrates, and oil and grease from stormwater. Stormwater Management offers an assortment of filter media, which is selected based on the pollutants expected at the site. The **StormFilter™** has the flexibility to be fine-tuned with different media if actual pollutant loadings/concentrations at a site differ from expectations, vary with a change in land use, or change due to regulations.



Specifications

- System sizing determined on number of flow-through cartridges needed to filter water quality flow or volume.
- A total of 2.3 feet of drop is needed from the invert of the inlet pipe.
- Detailed construction specifications are available from the manufacturer.

Site Constraints/Installation Requirements

- If high flow bypasses are required, the **StormGate™** high flow bypass from Stormwater Management can be used.
- Maintenance access is required.

- Traffic-bearing lids are available for parking lot installations.
- Anti-buoyancy measures need to be evaluated.

Applications

Applications have included:

- Parking lots for ultra-urban environments such as fast food restaurants, shopping malls, medical facilities, waste transfer stations, and light industrial developments.
- Roadways ranging from single-family residential to arterial roadways and major freeway systems.

Pretreatment Required?

Pretreatment needs vary depending on site characteristics. Examples of upstream practices include:

- Pavement sweeping and other source control measures
- Trapped and sump catch basins
- Detention ponds, vaults, or pipes
- Sedimentation forebays
- Oil-water separators and hydrodynamic devices.

Performance

Performance claims vary with pollutant type and concentrations, particle size distributions etc. Independent and laboratory studies are available on the web site at www.stormwaterinc.com EXIT disclaimer and from the R&D department for specific pollutants. Data include removals of TSS, Ortho-P, Oil and Grease, TPH, Soluble metals such as copper and zinc and other pollutants such as pentachloro-phenol. Water characterization studies are available for specialized applications."

Maintenance

Annual maintenance is recommended, and should be incorporated into the stormwater management plan for the entire site. Typical maintenance involves sediment removal and cartridge removal and recharging as necessary. Operations and maintenance guidelines are available from Stormwater Management. The company also provides maintenance services, site assessments, and notification to regulatory agencies when the units are

maintained and are in compliance.

Longevity

Structural design is on the order of 50 years.

Secondary Beneficial Impacts

- Availability of different media allows for targeting of site-specific pollutants after construction.
- Residuals can be recomposted to complete the sustainable cycle.
- Continued product support and system maintenance provided by Stormwater Management.

Costs

The **StormFilter™** has demonstrated significant cost savings over conventional stormwater treatment technologies when land costs are factored in. System costs vary depending on structural needs, depth, type of lid etc. A 6' x 12' **StormFilter™** (filters a flow-through volume of 0.3 cfs) will cost approximately \$15,000; an 8' x 18' **StormFilter™** (filters a flow-through volume of 0.8 cfs) will cost approximately \$30,000. Larger units (filtering a flow-through volume of over 8 cfs) range from \$30,000 to \$200,000. The catch basin system starts at \$2500.

Delivery Time

Stormwater Management provides engineering design assistance to the site civil engineer. During the construction phase, pre-cast units are available typically within four weeks from approval of shop drawings. Larger cast-in-place units are scheduled by the general contractor. System components are generally available within four weeks of purchase order.

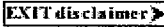
Installations

- California
- Colorado
- Delaware
- Florida
- Idaho
- Kansas
- Maryland
- Montana
- New Jersey

2-3000
for 25 ac
Mike
Macniskey
on 9/13/02

- New Mexico
- North Carolina
- Ohio
- Oregon
- Vermont
- Virginia
- Washington, DC
- Washington

Additional Information

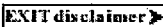
- Product Guide
- Design Manual
- 3-year Technical Summary
- General Information Document
- BMP Manual (available to agencies for BMP review only)
- Engineering support for the **StormFilter™** and other stormwater applications
- AutoCAD drawings can be downloaded from Stormwater Management's FTP site at www.stormwaterinc.com 

Manufacturer

Company: Stormwater Management
Address: 2035 NE Columbia Boulevard
Portland, OR 97211

Telephone: (503) 240-3393 or (800) 548-4667

Fax: (503) 240-9553

Website: www.stormwaterinc.com 

Contact: James H. Lenhart, Vice President of Engineering and Research

NE Contact: Adam Sapp
Phone: (610) 998-0537
Fax: (610) 998-0539
eMail: asappy@aol.com

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URL: <http://www.epa.gov/ne/steward/ceitts/stormwater/techs/stormfilter.html>


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AbTech Ultra-Urban™ Filter with OARS® Onboard

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Narrative Description

The Ultra-Urban Filter with OARS OnBoard, developed and manufactured by AbTech Industries, is an innovative low-cost BMP designed to help meet NPDES requirements with easy installation, effective filtration, and moderate maintenance. The Ultra-Urban Filter captures oil, grease, trash, and sediment from stormwater runoff before it enters the storm drain system. The Ultra-Urban Filter is ideal for municipal, industrial, and construction applications for reducing Nonpoint Source Pollution.

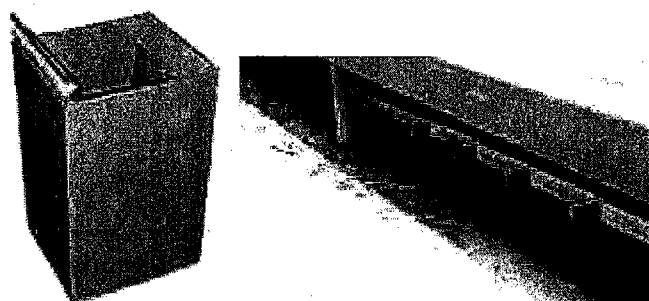
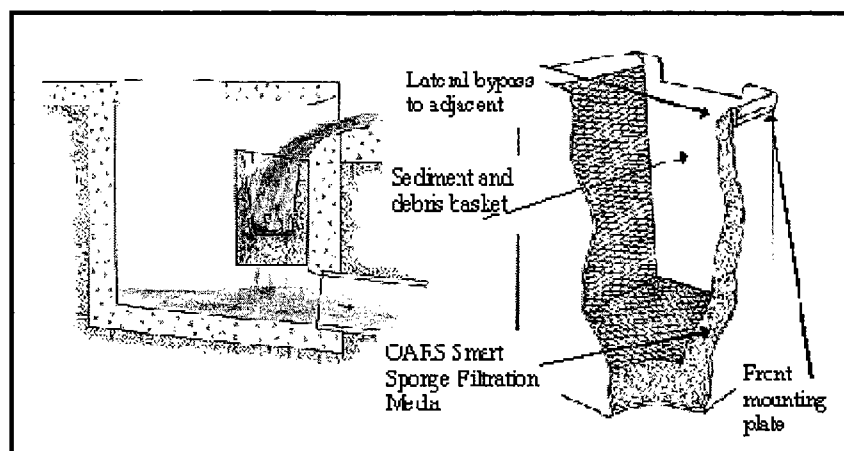
The Ultra-Urban Filter is designed for use in storm drains that experience oil and grease pollution accompanied by sediment and debris. Trash and sediment accumulate in the internal basket while oil and grease are captured in the filtration media. Field tests have proven that the proprietary OARS Smart Sponge filtration media will remove up to 80% of the oil and grease in stormwater runoff. Oil is bonded within the Smart Sponge, eliminating the possibilities of leaching back into the environment.

Specifications

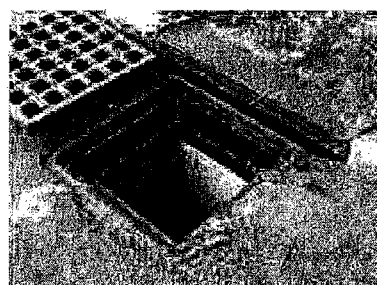
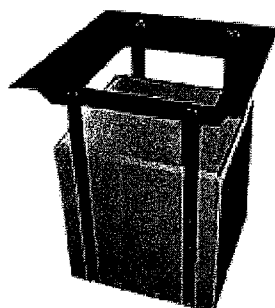
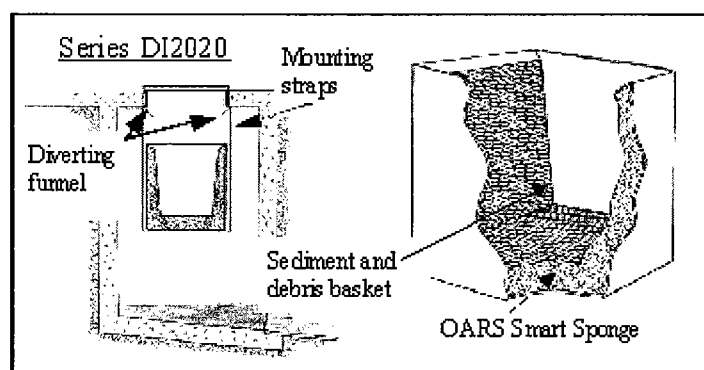
The Ultra-Urban Filter Series CO1414 is made of a high strength corrugated plastic, available for use in curb opening (inlet) stormdrains. The Ultra-Urban Filter, Series CO1414 have perforated cut-outs on each side of the module near the top. These cut-outs allow the installer to create a lateral overflow of stormwater to additional Ultra-Urban Filters modules in the stormdrain as needed. In high flow situations, modules will allow stormwater bypass to occur, eliminating any possibility of flooding. All modules in the CO1414 Series have common outer dimensions of 13" x 14" x 23". These Filters are designed to be placed in a series in curb side drains to cover the length of the curb inlet.

Site Constraints/Installation Requirements

Series CO1414 of the Ultra-Urban Filter is easily installed in approximately one hour through a maintenance access of at least 24 inches in diameter. A single mounting bracket made of 16-gauge steel is required for the installation. The bracket can be attached to any vertical surface capable of supporting 250 pounds.



The Series DI2020 Ultra-Urban Filter will suspend from the drain into the catch basin through a structural plastic mounting collar and funnel mechanism (see diagram). The complete installation time of the DI2020 is less than 5 minutes. The Ultra-Urban Filter should not be installed in drains where modules obstruct the drain pipe outlet. The size of the drain should allow room for overflow. The previous diagram depicts a side-view of the Ultra-Urban Filter Series DI 2020 installed in a storm drain.



Applications

Ultra--Urban™ Filters are designed for use in storm drains that experience oil and grease pollution accompanied by low concentrations of sediment and debris. A typical curb--opening style storm drain has three to five modules per drain. In high flow situations, modules will allow bypass flow to occur, preventing any possibility of flooding.

Pretreatment Required?

No pretreatment is required for **Ultra--Urban™ Filter** use.

Performance

Independent testing performed at the University of California, Los Angeles has confirmed the ability of Ultra-Urban Filters to remove up to 80% of the petroleum hydrocarbons in low flow situations. The captured oil becomes permanently bonded within the Smart Sponge, eliminating leaching and providing for easy disposal of the filtration media . In addition to oil and grease, each module has the capacity to capture debris and sediment. Flow rates through the filters exceed 70 gpm for the CO1414 and greater than 110 gpm for the DI2020 series at installation.

Maintenance

Ultra-Urban Filters should be serviced as needed to remove sediment and debris, according to expected debris accumulation. The sediment and debris can be quickly vacuumed out of the modules with conventional maintenance equipment. For example: a curb inlet with four to five Ultra-Urban Filter modules can be serviced in 10 minutes or less in a typical installation.

Longevity

Under normal operating conditions, the entire recyclable filter box should be replaced every 1-3 years.

Secondary Beneficial Impacts

Ultra--Urban™ Filters use a hydrocarbon absorbent media that is disposable as a solid waste, which lowers disposal cost and prevents further environmental pollution associated.

Costs

Please contact AbTech Industries for product pricing. Installation costs of the **Ultra-Urban™ Filters** are minimal because only minor modifications to existing drainage structures are required.

Delivery Time

Contact AbTech Industries for delivery time.

Installations

- City of Santa Monica, CA
- Loyola Marymont University, CA
- Springfield, Mass
- Los Angeles, CA
- Beverly Hills, CA
- El Monte, CA
- Calabasas, CA
- Goleta, GA
- Santa Barbara, CA
- El Paso, TX
- Santa Fe Springs, CA

Additional Information

Independent testing data is available from AbTech Industries.

Manufacturer

Company: AbTech Industries
Address: 4110 North Scottsdale Road, Suite 235
Scottsdale, AZ 85251

Telephone: (480) 874-4000 or (800) 545-8999
Fax: (480) 970-1665
eMail: info@abtechindustries.com
Website: www.abtechindustries.com [EXIT disclaimer >](#)

Contact: Don Thompson, Marketing Coordinator

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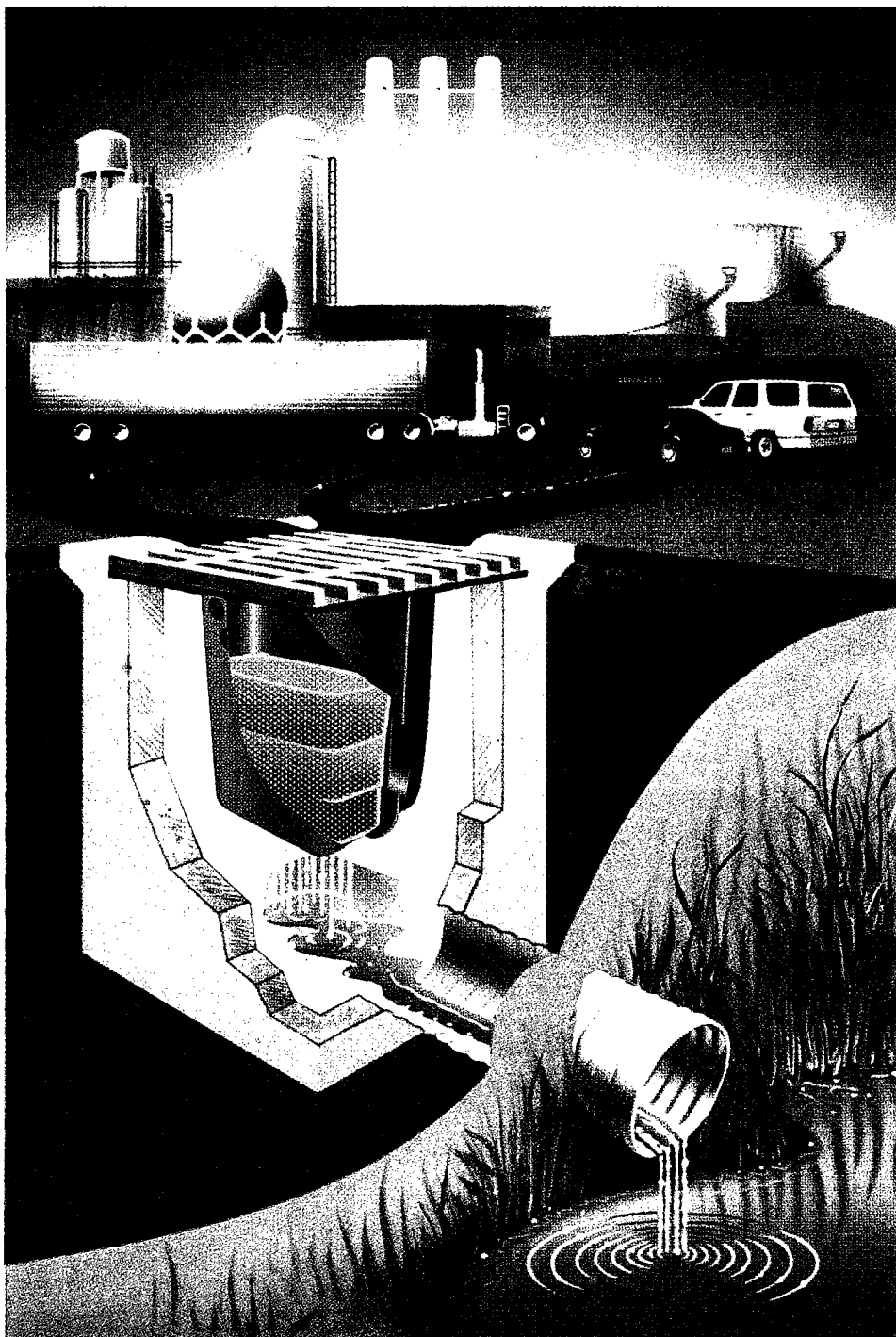
Last updated on Tuesday, August 6th, 2002

URL: <http://www.epa.gov/ne/steward/ceitts/stormwater/techs/abtechfilter.html>

NORTHWEST STORMWATER SOLUTIONS, Inc
P.O. Box 291 Mukilteo, WA 98275
(425) 347-6856 (206) 795-0843

Hydro-Kleen™ Filtration System

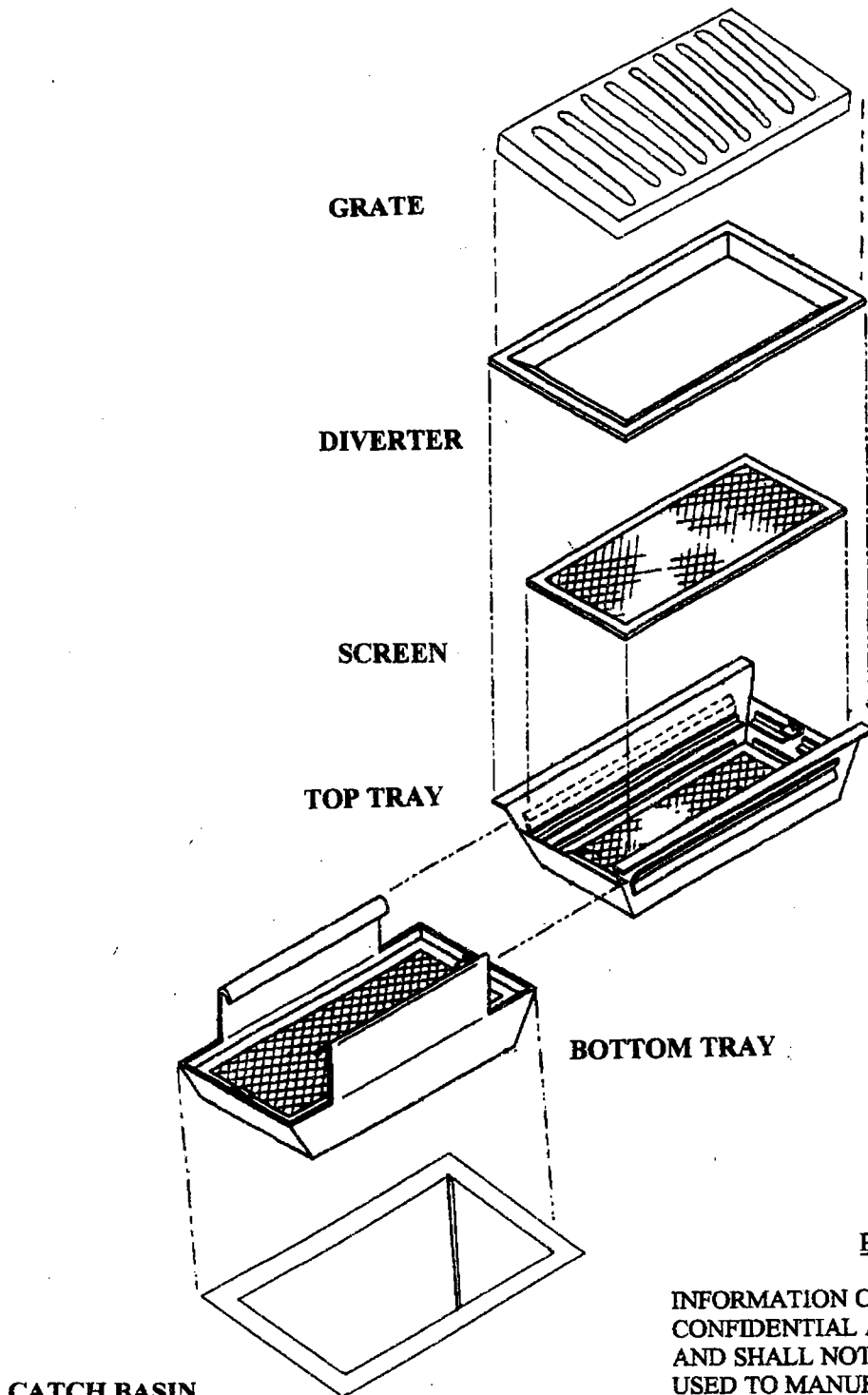
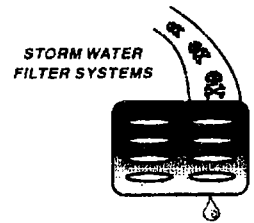
- Price for a typical catch basin insert range from \$1500.00 to \$2500.00.
- Removes hydrocarbons, organically bound metals, PCB's, pesticides, VOC's, sulfides and other contaminating waste products from wet weather and industrial runoff.
- Certified laboratory tested.
- Recognized as a "Best Management Practice".
- Can be customized to remove site specific substances.
- Satisfies structural BMP requirements for NPDES compliance and most local regulations.
- Can replace most oil-water separators at a fraction of the cost.
- Retro-fit existing catch basins or customize for new drain systems.
- Can work with or without internal sedimentation chamber and/or in conjunction with other BMPs.
- Flexible installation for various catch basin sizes.
- Equipped with an overflow bypass to assure continued flow in the event of high volume storm events.
- Patented System.



Reduces Pollution Runoff at the Source

ENVIRO-DRAIN[®], INC.

P.O. Box 1930 • Snohomish, WA 98291-1930
Toll Free 1-800-820-1953 • (206) 363-0316 • Fax (206) 362-9354
www.enviro-drain.com



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TWO TRAY INTERLOCKING INSERT

ENVIRO-DRAIN[®]™ Specifications

Flow Rate¹ 0-60 gpm
 Nominal Flow 3-8 gpm
 Electrical None
 Dimensions² Standard/Custom Sizes
 Dry Weight 50 lbs.

Filter Materials Filter Fabric,
 Absorbent W[™] and Activated Carbon
 Mechanism Gravity Feed Capable
 of All Types of Filter Medium
 Construction 100% Stainless Steel

¹Based on Filter Fabric used, determines gallons per minute

²These measurements are based on the standard catch basin designs. Custom sizes also available

When Enviro-Drain stormwater filter is installed in catch basins, contaminated water enters through the grate and the water is diverted to enter Enviro-Drain, filtering out sediments, cigarette butts, rocks, leaves, and grass clippings in the top tray. The second tray is filled with Absorbent W[™], a natural cellulose fiber that retains up to 7 times its weight in oil. The third filter is filled with activated carbon to neutralize fertilizers and pesticides. Each tray has its own characteristics and are properly spaced to eliminate clogging while providing aeration to the water which is needed to break down organic compounds and provide fish with adequate oxygen. By allowing you to use any variety or combination of filter medium Enviro-Drain stormwater filter is much more versatile and cost effective than other types of filters. Test results of Enviro-Drain stormwater filter proved to be very successful with up to 96% removal of efficiencies.*

*Test results can be provided upon request.

DESCRIPTION PART

Storm Water Pollution Filter

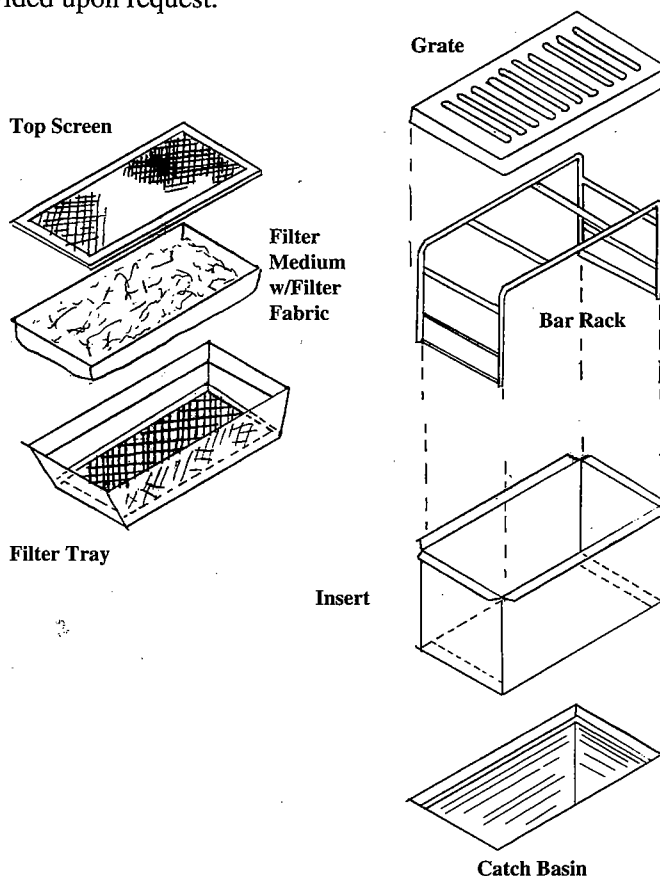
18" x 24" x 14" d Insert 100
 16" x 24" x 14" d Insert 500
 8" x 24" x 13" d Bar Rack 110
 " x 24" x 13" d Bar Rack 510
 18" x 24" x 3" d Tray (Empty) 101
 (Carbon) 102
 (Wood Fiber) 103
 16" x 24" x 3" d Tray (Empty) 501
 (Carbon) 502
 (Wood Fiber) 503
 18" x 24" x .25" d Rack Screen 120
 16" x 24" x .25" d Rack Screen 520
 18" x 24" Diverter 200
 16" x 24" Diverter 600

DESCRIPTION PART

Storm Water Sediment Filter

Use same inserts, bar racks, rack screens and
 diverters as in 100 & 500 series filters

18" x 24" x 15" d 300-303



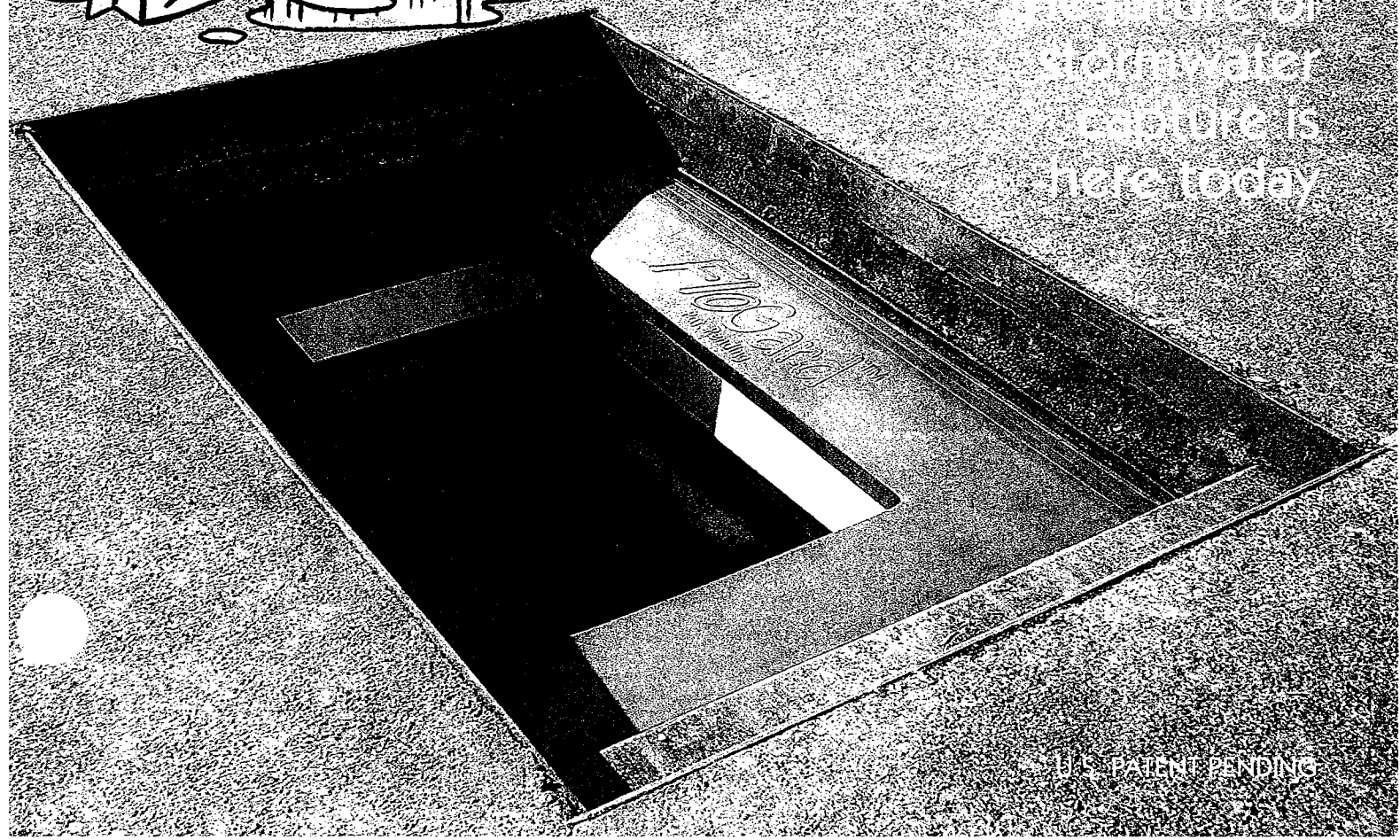
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- Express Warranty.** ENVIRO-DRAIN, INC. expressly warrants this product to be free from defects in material, workmanship and title.
- Disclaimer of Implied and Other Warranties.** THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER WRITTEN, IMPLIED (INCLUDING WITHOUT LIMITATION A WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE).
 In the event that any product is found to be defective in workmanship or material, ENVIRO-DRAIN, INC. agrees to repair or replace such product at its option. If the product is to be repaired, Buyer will bear responsibility for returning such product to ENVIRO-DRAIN, INC. If ENVIRO-DRAIN, INC., is unable to effect such repair or replacement within 30 days (which time is agreed to be reasonable), Buyer will have the additional remedy of returning the defective product to ENVIRO-DRAIN, INC. for a full refund of the purchase price. **THESE REMEDIES ARE EXCLUSIVE, AND BUYER AGREES THIS SHALL BE THE LIMIT OF ANY LIABILITY ON THE PART OF ENVIRO-DRAIN, INC.**
- Consequential and Incidental Damages Excluded.** Buyer assumes all responsibility for the consequences of use of the product. ENVIRO-DRAIN, INC. assumes no liability for consequential and/or incidental damages of any kind (including without limitation injury to the person); under no circumstances will ENVIRO-DRAIN, INC. be liable for such damages. Buyer agrees the limitation and exclusion in this paragraph is independent of the limitation of remedies contained in the preceding paragraph.



FloGardTM +PLUS

The future of
stormwater
capture is
here today



U.S. PATENT PENDING

Unparalleled stormwater capture capability

HDPE adapter ring (cut to fit catch basin ID) allows for usage in a wide range of sizes and styles

Debris trap

"Ultimate" high-flow bypass

Initial "Filtering" high-flow bypass

Stainless steel construction assures long service life

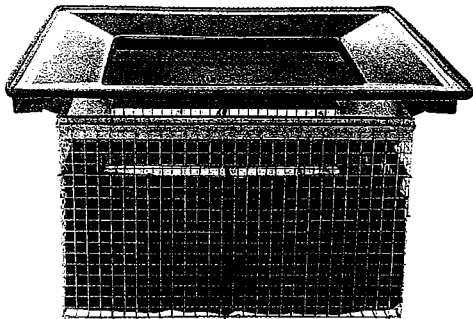
Filter liner is effective in the collection of sediment, debris and trash without the retention of water

FloGard+PLUS™ is the most effective and flexible catch basin filtration system available today.

This is a typical collection from the FloGard+PLUS™. In this pile can be found trash we all see daily, lying in gutter, along the side of the highway, and in parking lots. What we don't readily see is the organic material that is also present here. This material goes mostly unnoticed, yet it is as great a polluter and probably more harmful to the environment than that plastic bottle discarded by an inconsiderate person. Grass clippings, shrubbery trimmings, or any other organic material that we fertilize or spray with pesticides and herbicides becomes a potentially deadly pollutant for aquatic life forms. FloGard+PLUS™ is designed to collect these potential pollutants PLUS harmful hydrocarbons (grease and oil) that have become an unfortunate part of our daily lives. PLUS it will do so at a low installation cost and a low maintenance cost. Help keep these piles off our beaches. Use FloGard+PLUS™.

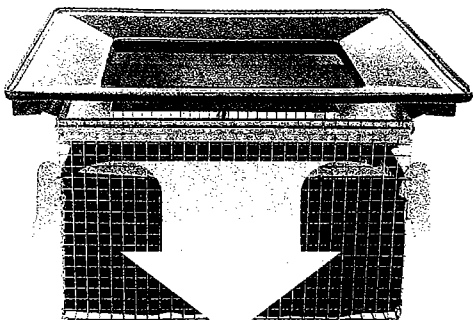


No restriction ... in even the heaviest flows



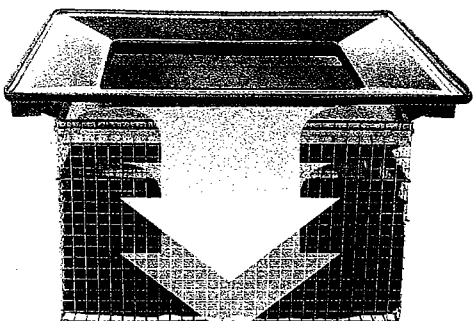
Filtering Flow

FloGard+PLUS™ is designed to capture sediment, debris, trash and oils/grease during low (first flush) flows.



Initial "Filtering" High-Flow Bypass

The FloGard+PLUS™ "Filtering" High-Flow Bypass allows higher flows to bypass the device while retaining sediment and larger floatables (debris and trash).



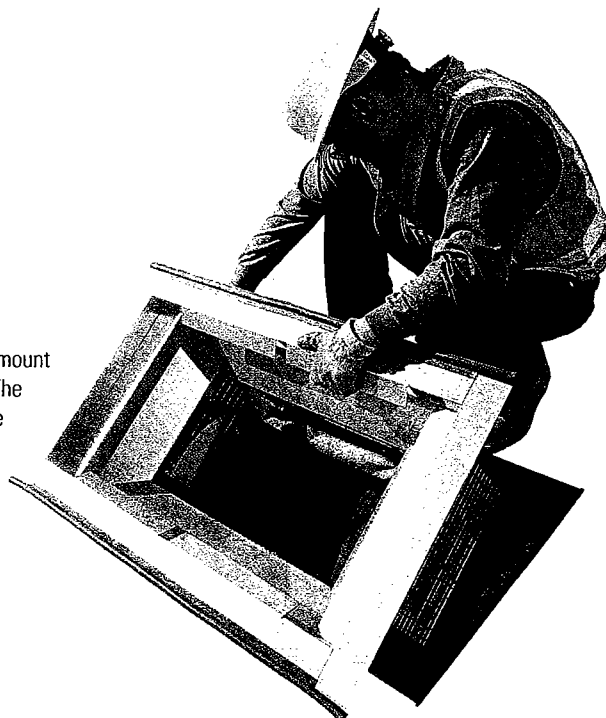
"Ultimate" High-Flow Bypass

This unique feature of the FloGard+PLUS™ allows sustained maximum design flows under extreme weather conditions or when full containment has been met, while continuing to retain collected pollutants.

Effective pollutants capture with dual bypass features means that FloGard+PLUS™ will effectively filter stormwater runoff but **NEVER** impede maximum design flows.

"Drop-In" Frame Mount Design

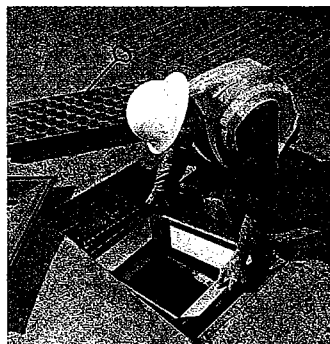
FloGard+PLUS™ is also available in a frame mount design to fit most industry-standard drains. The frame mount model offers the same effective filtering capacity and dual bypass features in a "drop-in" design.



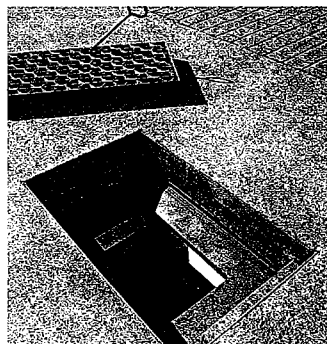
As easy to install as 1 ... 2 ... 3



STEP 1 – Remove the catch basin grate and measure the inside dimensions. Cut the adapter ring to fit. Molded guides make this step easy.

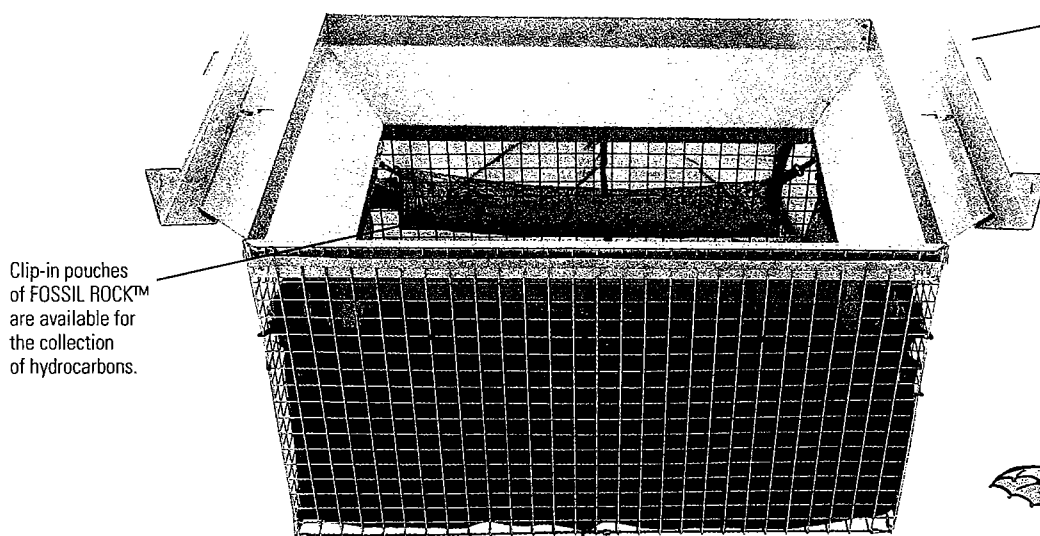


STEP 2 – Install wall mount brackets and set FloGard+PLUS™ into place.*



STEP 3 – Place the adapter ring into the catch basin, resting it on the FloGard+PLUS™. How much easier can it be!

Additional features of FloGard+PLUS™



Clip-in pouches of FOSSIL ROCK™ are available for the collection of hydrocarbons.

The mounting bracket facilitates easy installation in irregular catch basins. At the same time the bracket creates a measured support for the adapter ring. This pre-measured dimension creates the "Ultimate" high-flow bypass area.

*The pictured instructions show the installation of a wall mounted device for non-standard drains. FloGard+PLUS™ is also available in frame mount designs and for combination and curb opening style catch basins.



Go with
"The Flo".™



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